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(54) **Computer able to Receive Broadcasts or Transmissions**

(57) A computer comprises data processing means (1) and operably connected thereto, input means (2), output means (3) and data storage means (4). The input means (2) comprise means (21) for receiving and demodulating into data teletext or videotex broadcasts or transmissions and said data processing means (1) comprise means (11) for transferring teletext or videotex data to said data storage means (4) for subsequent access and/or retrieval by said data processing means.

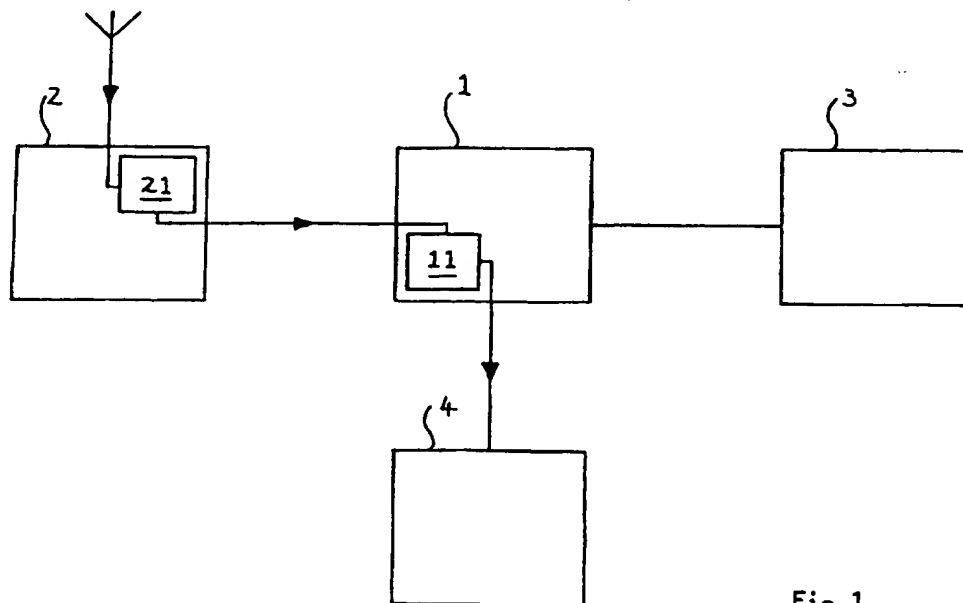


Fig. 1

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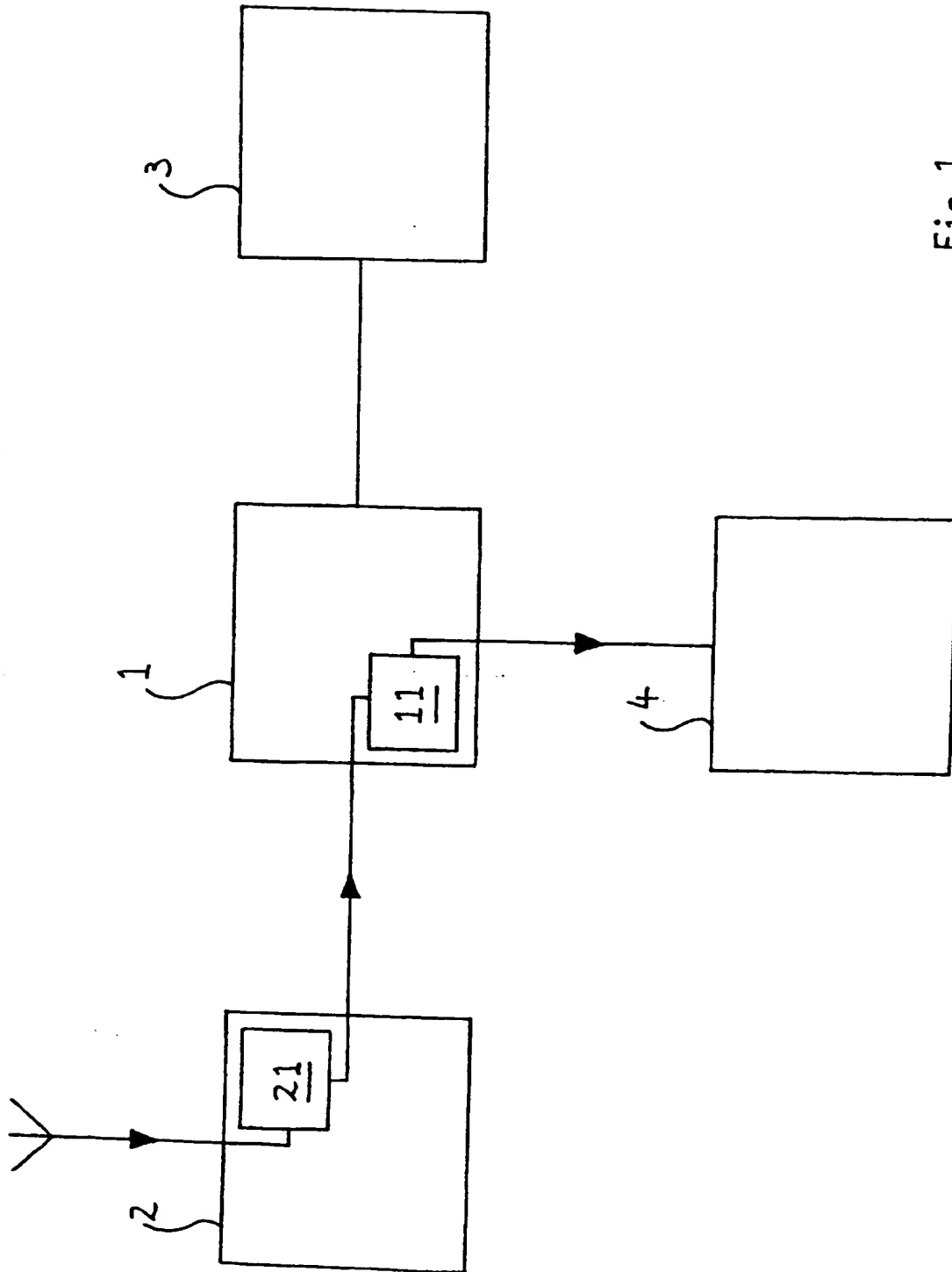


Fig. 1

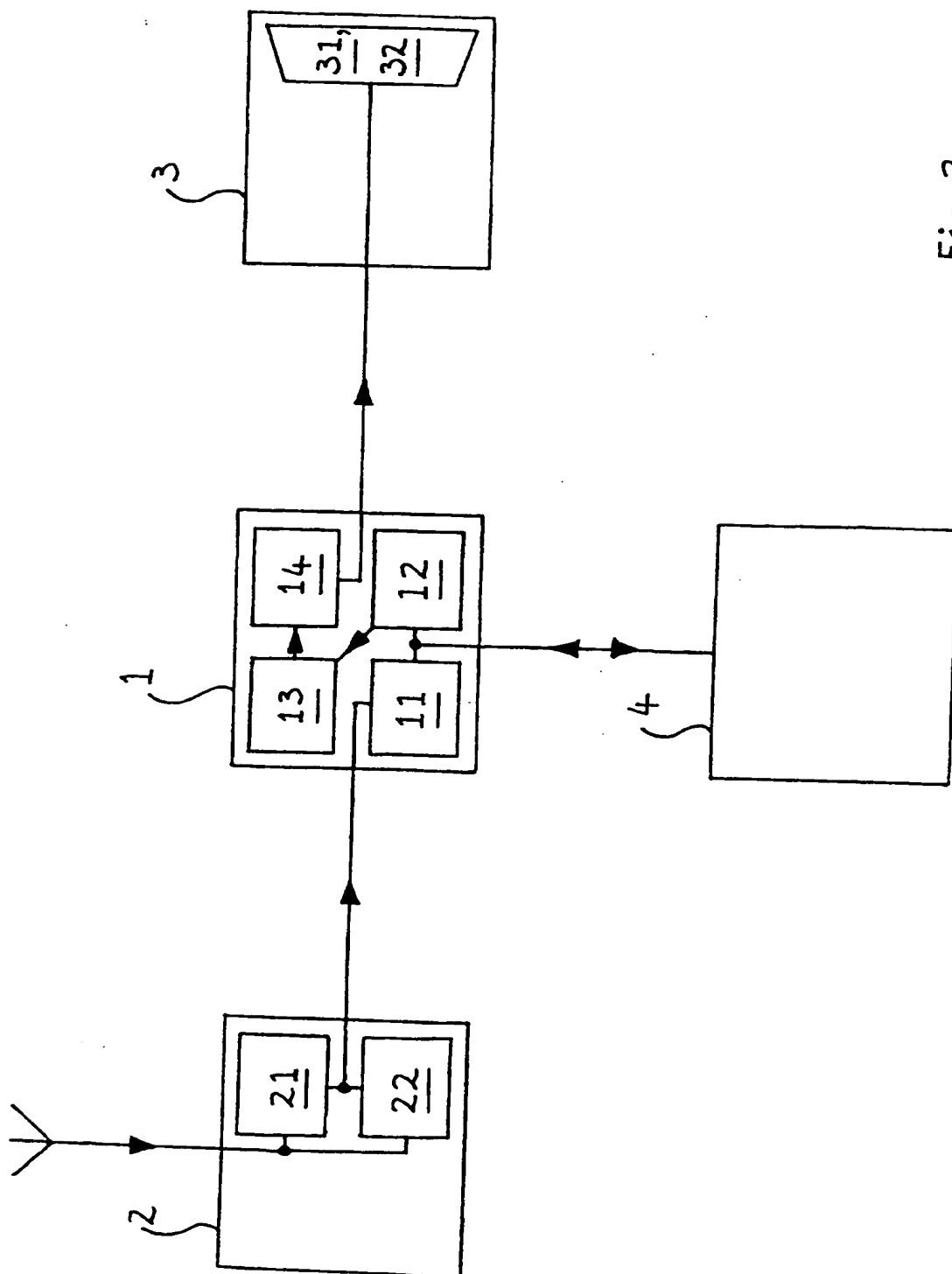


Fig. 2

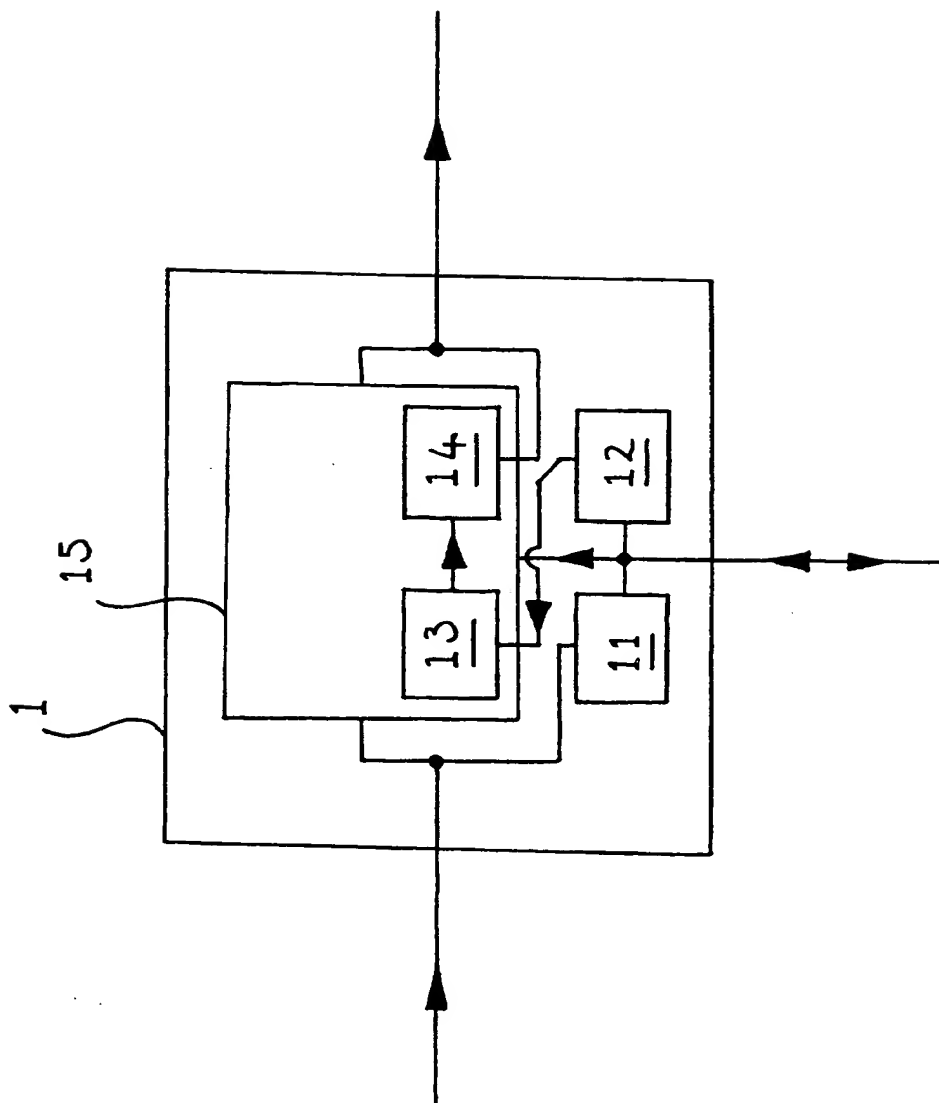


Fig. 3

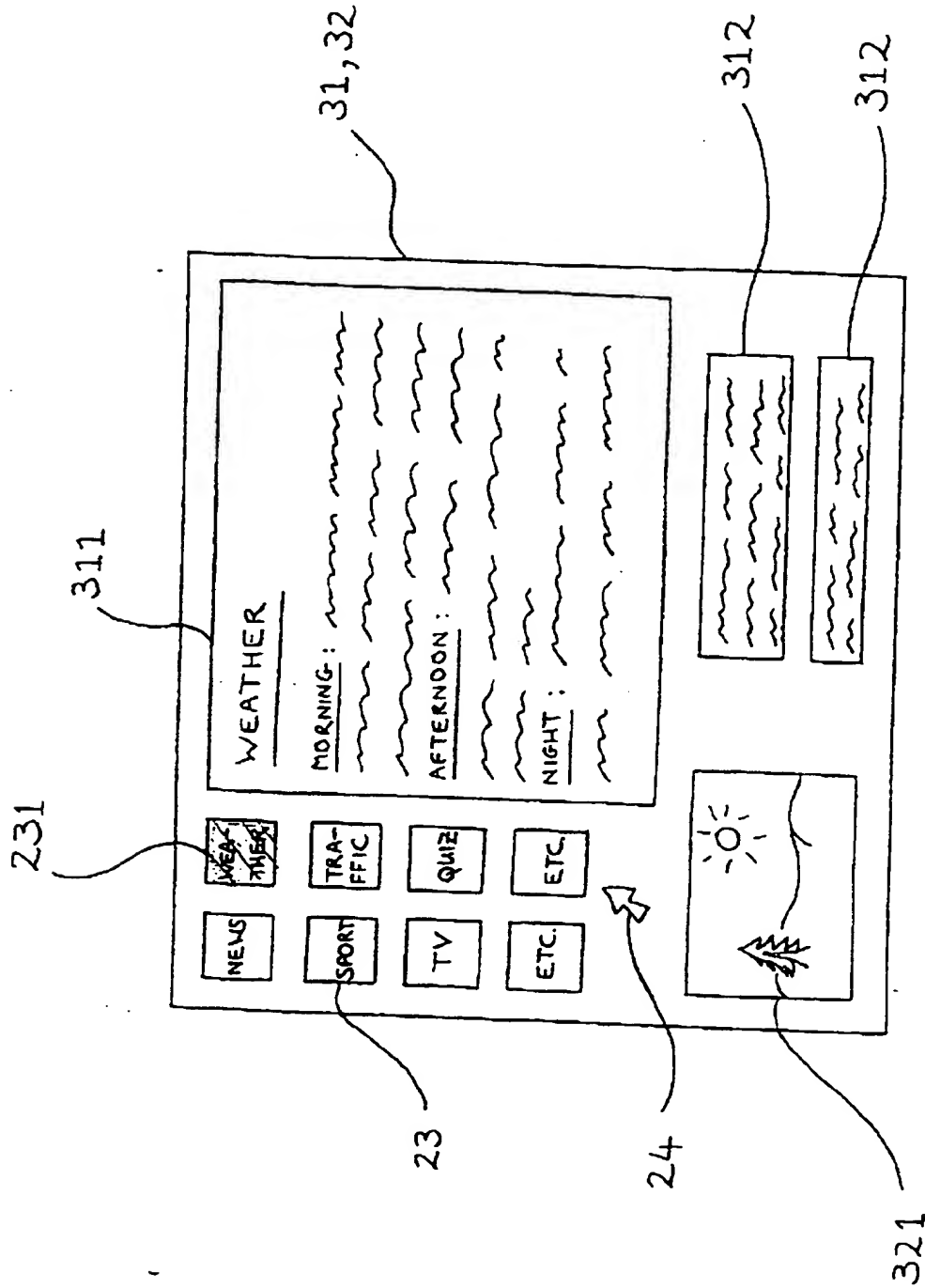


Fig. 4

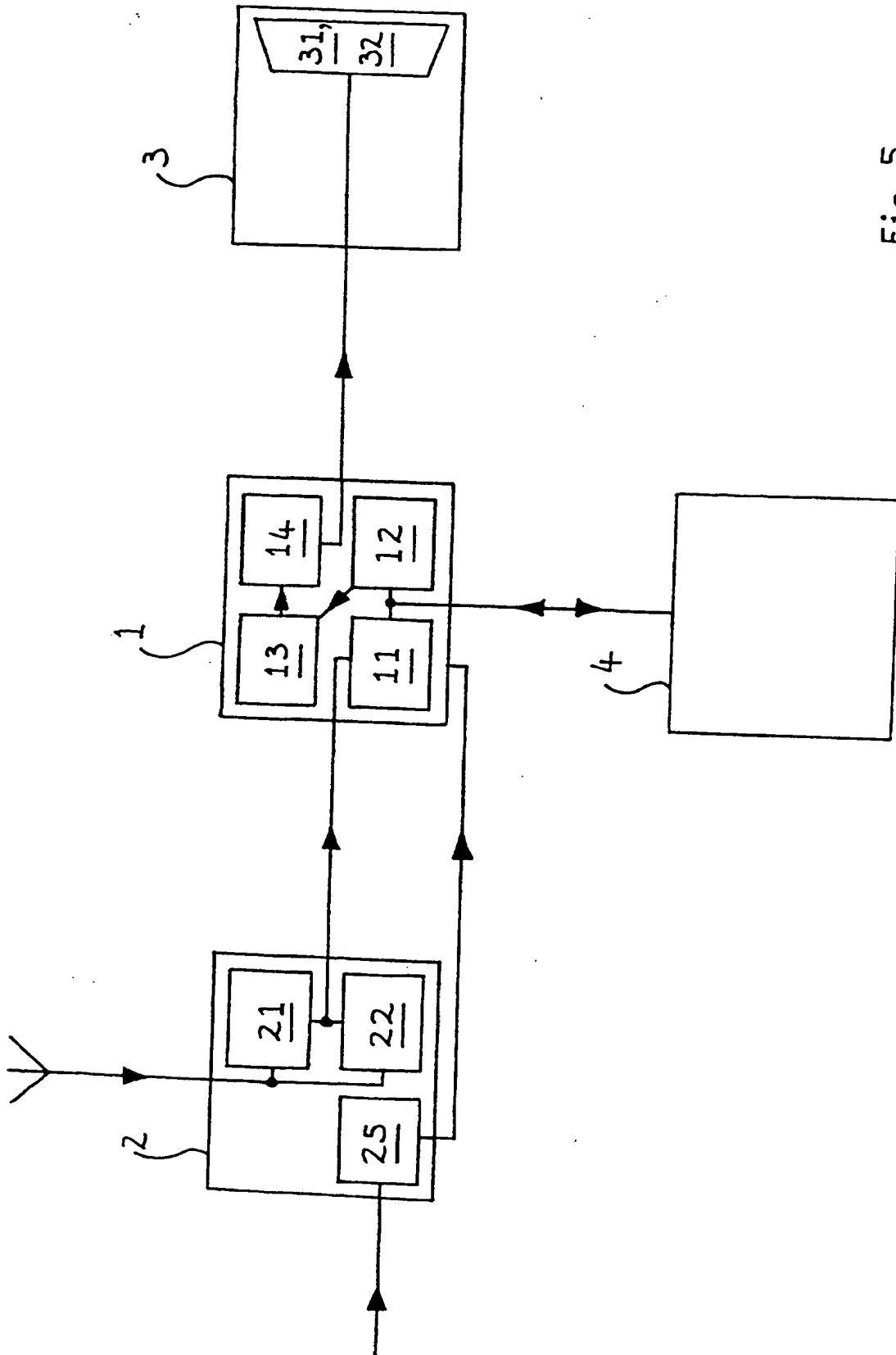


Fig. 5

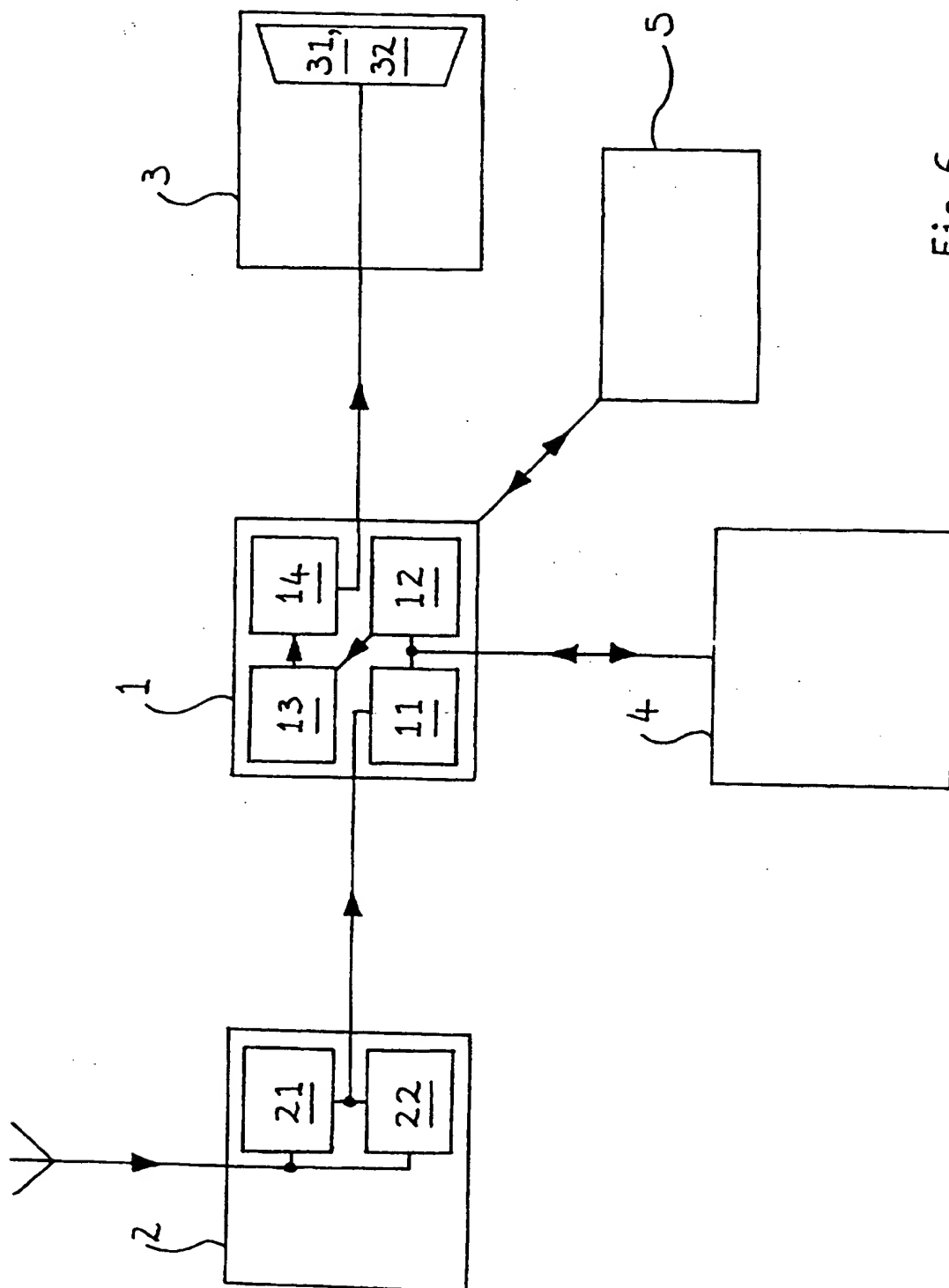


Fig. 6

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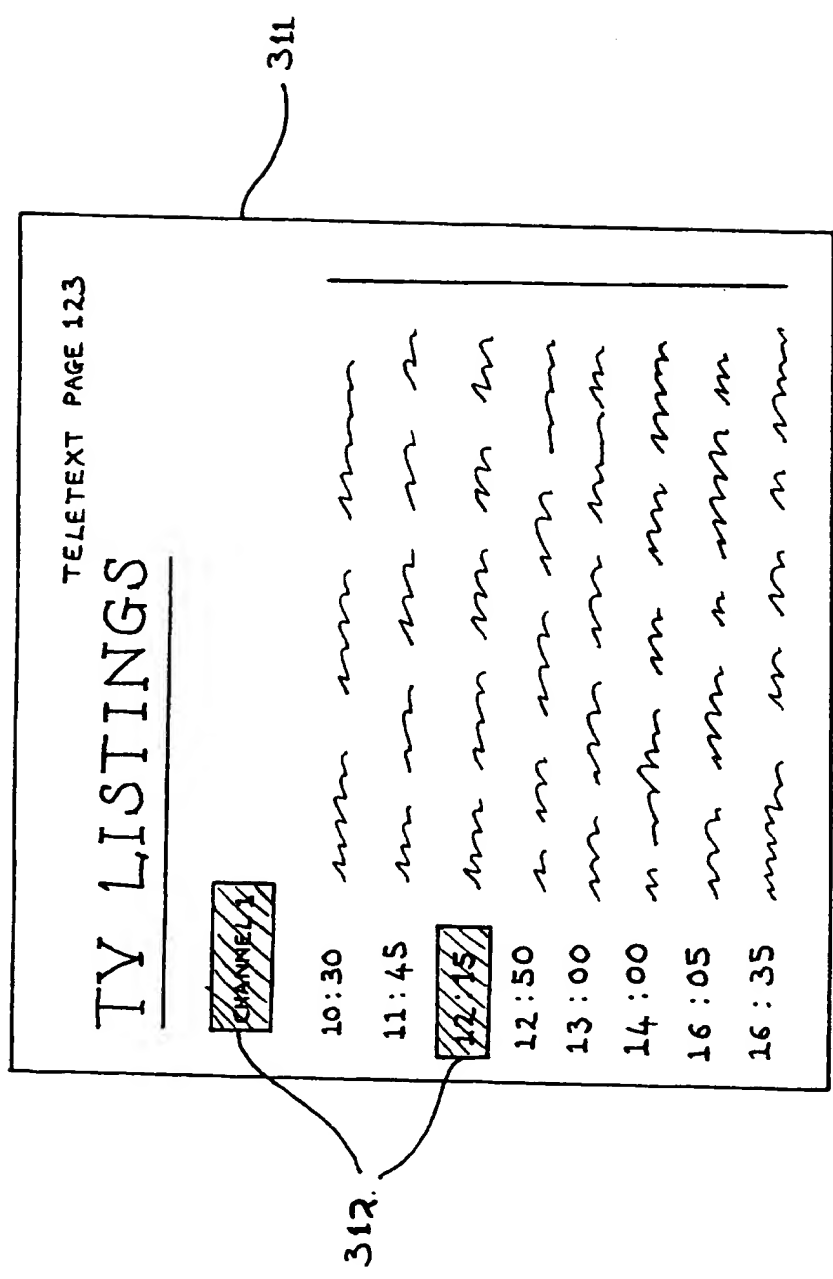


Fig. 7

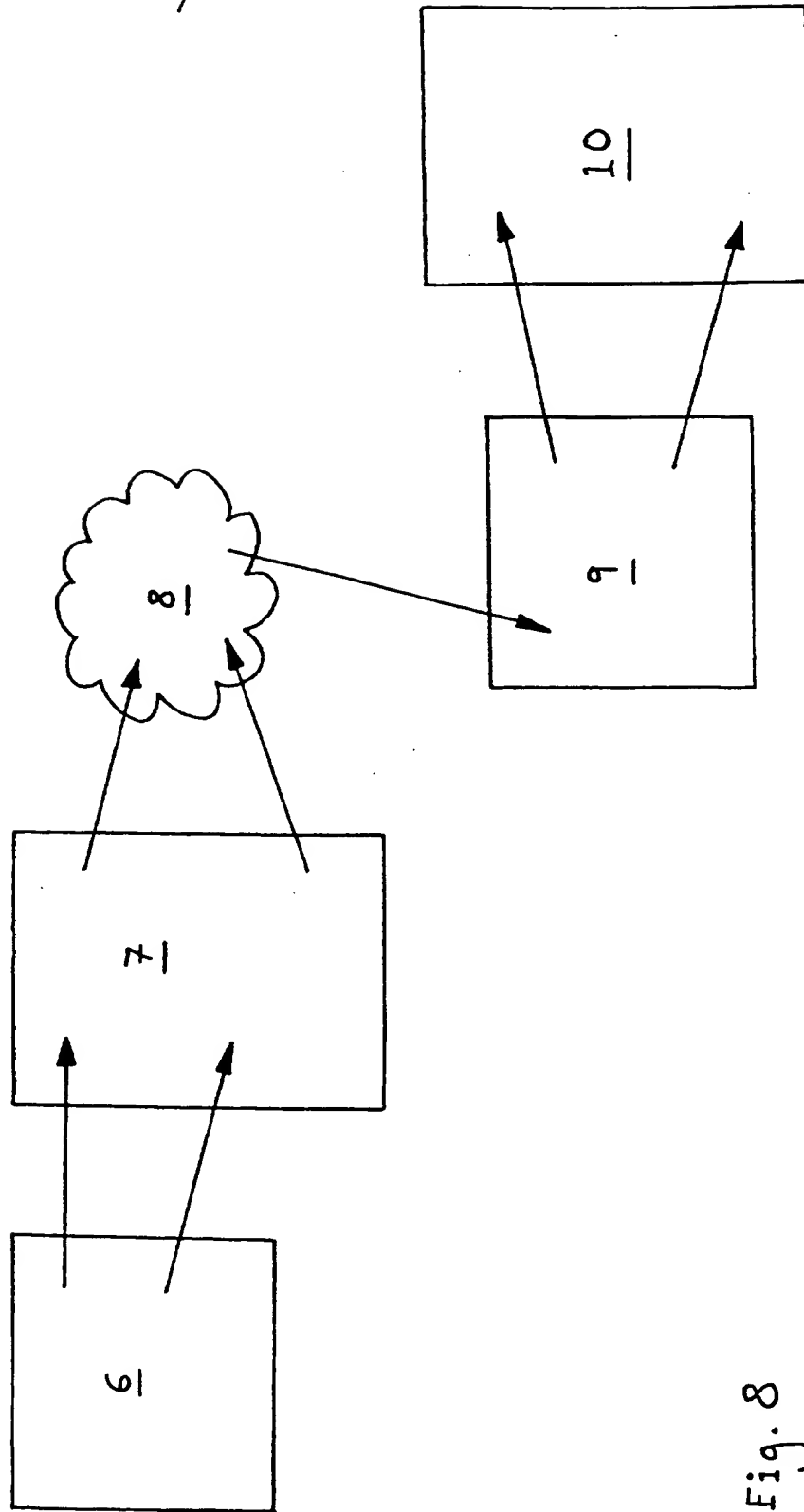


Fig. 8

COMPUTER ABLE TO RECEIVE BROADCASTS OR TRANSMISSIONS

This invention relates to computers comprising data processing means and operably connected thereto, input means, output means and data storage means. More specifically, it relates to computers in which the input means comprise means for receiving and demodulating broadcasts or transmissions, for example a socket for receiving an aerial or transmission line together with tuning, reception and demodulation circuitry. Typically in such computers, the data processing means comprise a semiconductor central processing unit (CPU), the input means further comprise a keyboard and a mouse (desktop bus), the data storage means comprise a solid-state memory device and a hard disk, and the output means comprise a display, such as a screen monitor, and a loudspeaker. However, the distinction between individual components of the input means and output means in such computers may become blurred, for example if the display shows an icon selectable by means of the mouse, as is usually possible with such computers.

In recent years, attempts to integrate computers with machines for receiving broadcasts or transmissions (like traditional radio receivers and television sets) have rendered computers able to receive television broadcasts or transmissions commonplace. However, such attempts have tended to produce computers which receive and display television largely independently of their operation for computing. The operation of such computers for receiving television thus differs little in character from the operation of traditional television sets. This means that when receiving and displaying television, such computers exhibit all of the problems previously associated with traditional television sets, without using their computing capabilities to solve these problems.

An example of a known computer able to receive television broadcasts or transmissions which does make some use of its computing capabilities to increase the degree of integration of its operation for computing with its operation for receiving television transmissions, but which fails to address the problems just stated, is a computer able to receive television broadcasts or transmissions, wherein the input means further comprise means for receiving information from the Internet and the output means comprise a screen monitor. In this known computer, the time available from when the image-forming electron beam of the screen monitor reaches the end of one frame of television to when the image-forming electron beam starts to project the next frame of television (this time being known as the vertical blank) is used by the data processing means of the computer to transfer via the means for receiving information from the Internet to the data storage means a web page pertaining to the television programme being displayed on the screen monitor (this transfer being known as vertical blank intercast or VBI). Thus a user of this known computer is able to access a web page pertaining to the television programme being displayed by instructing the data processing means to retrieve the web page from the data storage means for display on the screen monitor.

Many of the examples of problems associated with traditional television sets also exhibited by known computers able to receive television broadcasts or transmissions arise if such computers are operable to receive and demodulate teletext or videotex broadcasts or transmissions. Teletext is a system of broadcasting or transmitting information - typically alphanumeric information - using the spare capacity of existing television channels. For example, in the United Kingdom, teletext services are broadcast or transmitted by the BBC, ITV and Channel 4 under the names of Ceefax, Oracle and 4-Tel, respectively. In the United Kingdom, the spare capacity of existing television channels used to transmit the teletext information is provided by the top four lines of each frame of television projected by the image-forming electron beam.

Television sets and computers able to receive television broadcasts or transmissions are conventionally arranged so that these top four lines are not displayed during display of a television programme. Videotex (also known as videotext) is a comparable system for transmitting alphanumeric information from a computer database using a telephonic connection to provide for two-way communication between a user and the computer database. Examples of the problems mentioned above include the following.

A user of a computer able to receive and demodulate teletext, if wishing to access information from teletext, must know the television channel and the number of the page of teletext on which the information is available. This may require prior knowledge on the part of the user or laborious searching through teletext pages until the desired page is found. Even if the channel and number of the desired page of teletext are known, the user must wait an appreciable length of time after entering this data whilst the desired page of teletext is received and demodulated by the computer prior to being displayed. This length of time increases as the number of screens occupied by the desired page of teletext increases. Other problems with known computers able to receive broadcasts or transmissions are also known.

One object of the present invention is to address the above-mentioned problems.

Another object of the present invention is to achieve a greater degree of integration in a computer able to receive television transmissions or broadcasts of its operation for computing with its operation for receiving television and other broadcasts or transmissions associated therewith, such as teletext.

A third object of the present invention is to use the computing capabilities of a computer able to receive and demodulate teletext or videotex broadcasts or

transmissions to increase the ease of use of such a computer for accessing information from teletext or videotex.

Thus, in one aspect, the present invention provides a computer comprising data processing means and operably connected thereto, input means, output means and data storage means, wherein said input means comprise means for receiving and demodulating into data teletext or videotex broadcasts or transmissions and said data processing means comprise means for transferring teletext or videotex data to said data storage means for subsequent access and/or retrieval by said data processing means.

In another aspect, the present invention provides a method of operating a computer comprising providing said computer with means for receiving teletext or videotex broadcasts or transmissions, demodulating said teletext or videotex broadcasts or transmissions into data and storing said data retrievably in a memory.

In a third aspect, the present invention provides for the use of a computer to receive teletext or videotex broadcasts or transmissions, demodulate said teletext or videotex broadcasts or transmissions into data and store said data retrievably in a memory.

The present invention will be better understood by means of the accompanying drawings, wherein:

Fig. 1 shows schematically the arrangement of a computer according to the invention and its operation for receiving, demodulating and storing teletext;

Fig. 2 shows schematically the arrangement and operation of a computer in a first embodiment of the invention;

Fig. 3 shows schematically the arrangement and operation of the data processing means of a computer in a second embodiment of the invention;

Fig. 4 shows the appearance of the display of a computer according to a third embodiment of the invention;

Fig. 5 shows schematically both the arrangement of a computer in a fourth embodiment of the invention and the operation of the computer for receiving from the Internet information relating to the operation of the computer for receiving, demodulating, storing and displaying teletext;

Fig. 6 shows schematically both the arrangement of a computer in a fifth embodiment of the invention, wherein the computer is operably connected to means for recording television programmes, and the operation of the computer when programmed to transfer television transmissions or broadcasts to the means for recording television programmes on the basis of information contained in teletext received, demodulated and stored by the computer;

Fig. 7 shows one possible appearance of the display of a computer arranged as in Fig. 6, wherein the time and channel of a television programme are selected from teletext information on the display;

Fig. 8 shows schematically the arrangement of a 32-bit application program linked to a 16-bit application program by thunking in a sixth embodiment of the invention.

Referring to Fig. 1, a computer according to the present invention has data processing means 1 (comprising a CPU) and operably connected thereto, input means 2, output means 3 and data storage means 4. Teletext or videotex broadcasts or transmissions are received and demodulated into data by means 21 which typically comprise a socket for receiving an aerial or transmission line, together with tuning, reception and demodulation circuitry of a type found in traditional television sets operable to receive and demodulate teletext. Means 11 transfer teletext or videotex data from the receiving and demodulation circuitry of 21 to the data storage means 4, where the data is available for subsequent access and/or retrieval. This operation has the advantage that teletext broadcasts or transmissions may be received, demodulated into data and

the data stored at times of low computer usage with near-instantaneous retrieval without requiring reception and demodulation at times of high computer usage.

A suitable data storage means 4 is a dedicated cache on a hard disk, in which case the means 11 for transferring the data thereto is a hard disk drive read/write head and control circuitry and/or software therefor, including suitable programming of the CPU in a manner well known to a person skilled in the art.

Referring to Fig. 2, the computer preferably comprises means 12 for retrieving teletext data from the data storage means 4 and conversion means 13 for converting teletext data into a format suitable for displaying at least one page of teletext. In the above-mentioned case where the data storage means 4 is a dedicated cache on a hard disk, the hard disk read/write head, the control circuitry therefor and the previously mentioned CPU between them can provide the means 12 for retrieving teletext data and the conversion means 13 by suitable programming of the CPU. The CPU can also be programmed to provide means 14 for transferring the result of such a conversion to the output means 3.

Fig. 2 also shows schematically a computer in which the output means 3 comprise display means 31 for displaying at least one page of teletext. Most usually, the display means 31 is a screen monitor, in which case the screen monitor can also be used as means 32 for displaying television programmes received by means 22 shown in Fig. 2 for receiving television transmissions or broadcasts. Means 22 are most readily provided by conventional television reception circuitry, preferably integrated with the means 21 for receiving and demodulating teletext or videotex. An example of the integration of the television and teletext reception means 22 and 21 is provided by a printed circuit board bearing a television tuner, a digitizer for demodulating a television signal received by the tuner into data representing successive frames of

television and a teletext chip for decoding the top four lines of each frame of television data thus demodulated into teletext information. An alternative example in which the teletext reception means 21 and the television reception means 22 are not combined on the same printed circuit board has a software implementation of the teletext reception means 21 in place of the teletext chip for decoding the teletext information. Such a software implementation of the teletext reception means 21 is made by suitable programming of the CPU previously mentioned. In such a case, the teletext reception means 21 may be said to form part of the data processing means 1, rather than part of the input means 2. Television broadcasts or transmissions received by the television reception means 22 may be transferred directly by the data processing means 1 to the screen monitor without intermediate storage in the data storage means 4. This is shown schematically in Fig. 3 by data transfer means 15.

In this case, teletext broadcasts or transmissions may also be received, demodulated into data and the data transferred by means 11 to the data storage means 4 at the same time as a television programme is being received and displayed via data transfer means 15. Teletext broadcasts may also be received and stored whilst the data processing means 1 is accessing and processing other data via the data transfer means 15 either from the input means 1 or from the data storage means 4, so that the computer may be operated for computing at the same time as it receives, demodulates and stores teletext "in the background". Teletext broadcasts or transmissions may also be received, demodulated into data and stored whilst the computer is otherwise not in operation. This latter alternative is achievable by programming the CPU to activate the transfer means 11 from its inoperable or "standby" mode to transfer teletext or videotext data to the data storage means 4 at a prespecifiable time.

The data transfer means 15 may also comprise the conversion means 13 and the means 14 for transferring teletext to the output means 3, as shown in Fig. 3, so that teletext

broadcasts or transmissions received by the teletext reception means 21 may be transferred directly to the screen monitor without intermediate storage or so that teletext may be monitored via the data transfer means 15 at the same time as being transferred by means 11 to the data storage means 4. In practice, the data transfer means 15 is preferably embodied by a CPU suitably programed to carry out the above functions.

Referring to Fig. 4, a preferred embodiment of the invention has the input means 2 comprising a plurality of selectable icons 23, which may be selected by means of a desktop mouse and its associated pointer 24. The icons 23 and pointer 24 are displayed on a screen monitor in the fashion usual in a graphical user interface of a computer. In this preferred embodiment, such a selectable icon 23 corresponds to a respective page of teletext, whereby selection of one of the icons 23 with the pointer 24 instructs the data processing means 1 to retrieve teletext data from the data storage means 4, this teletext data corresponding to the page of teletext for the icon selected. In Fig. 4, reference numeral 231 represents an icon thus selected. The icons 23 are conveniently labelled pictographically or alphanumerically to indicate the respective page of teletext each icon 23 represents. Such an arrangement has the advantages that a page of teletext may be retrieved near-instantaneously from the data storage means 4 without a user of the computer in this preferred embodiment of the invention needing to know the number or channel of a desired page of teletext and without having to wait for the desired page to be received and demodulated.

Fig. 4 also shows that the screen monitor on which the selectable icons 23 and the pointer 24 are displayed provides the display means 31 for displaying at least one page of teletext and the means 32 for displaying television programmes. A television programme 321 may be displayed in a window on the screen monitor as shown in Fig. 4, or it may be displayed to occupy the full screen or otherwise. A page 311 of teletext

may be displayed to occupy the full screen, in a window on the screen, as sub- or surtitles or otherwise. In Fig. 4, a page 311 of teletext corresponding to the selected icon 231 is displayed. In addition, an extract 312 from the displayed page of teletext 311 or from a previously displayed page of teletext may be taken for its independent display and manipulation, such as for its incorporation into a word processing document by using conventional "cutting and pasting" techniques. The extract is taken by means of the mouse and its associated pointer, 24. As is shown in Fig. 4, the display means 31 for displaying at least one page of teletext is operable simultaneously with the means 32 for displaying television programmes. A page of teletext and a television programme may alternatively be displayed consecutively or independently. Such a variety of display modes for television programmes and for teletext pages may be achieved by suitable programming of the CPU in a manner well-known to a person skilled in the art.

In an embodiment like that shown in Fig. 4, the selectable icons 23 are a subset of a much larger menu of icons available to a user of the computer. Thus the selectable icons 23 may be chosen by the user from the menu of icons to be the icons corresponding to respective pages of teletext, access to which is most likely to be desired by the user.

In such a case as when the icons 23 are labelled pictographically or alphanumerically, the data processing means is preferably operable to assign the correct respective page of teletext to its respective icon 23. This may be achieved by initial programming of the CPU. However, since page numbers of information contained in teletext change occasionally, the input means 2 also preferably comprise means 25 for receiving information specifying which page of teletext the data processing means 1 is operable to assign to which icon 23. The means 25 may be a keyboard and a mouse with the specifying information being supplied by the user of the computer. Alternatively, the

means 25 may be identical with the television and teletext reception means 22 and 21, so that the specifying information is received along with the teletext information itself. Another alternative, as shown in Fig. 5, is that the means 25 for receiving information is an operable connection to the Internet, so that the data processing means 1 may be operated to assign the respective icons to the respective pages of teletext corresponding to these icons from a remote location. In this case, the specifying information is received by the vertical blank intercast (VBI) technique described above. The latter two alternatives have the advantage that a primary (local) user of the computer need not take any action to ensure that the data processing means 1 assigns the correct respective page of teletext to its respective icon or need not even know that such an assignment is taking place.

Both of the latter two alternatives for the means 25 (an operable connection to the Internet or the provision of the means 25 by the television and teletext reception means 22 and 21) may also be used to program the data processing means 1 from a remote location to transfer teletext data to the data storage means 4 at a prespecifiable time, for example in the early morning each day when the computer is unlikely to be used by its primary user. For the avoidance of confusion, the teletext data itself is in this case still received (as always) via the teletext reception means 21. Only the information specifying the time at which the teletext data is to be stored has the possibility of instead being received over the Internet. The means 25 may also be used to program the data processing means 1 from a remote location, to update the teletext data stored in the data storage means 4 at prespecifiable times throughout the day for user-definable pages of teletext, such as news pages. Alternatively or additionally, the computer's primary (local) user may program the data processing means 1 to transfer teletext data to the data storage means 4 at a prespecifiable time or times throughout the day.

In a further preferred embodiment of the invention, the input means comprise means for selecting a part 312 of a page 311 of teletext displayed by the display means 31, so that, for example, the time and channel of a television programme may be selected from a page 311 of teletext which contains television programme listings, as shown in Fig. 7. In a computer having a Windows-based graphical user interface, the means for selecting a part 312 of a page of teletext 311 is most readily provided by means of the mouse and its associated pointer, 24. If the data processing means 1 in this preferred embodiment also comprises an operable connection to means 5 for recording television programmes, such as a digital video disk (DVD) RAM drive, as shown schematically in Fig. 6, then the data processing means 1 may be programmed to transfer television transmissions or broadcasts to the means 5 for recording television programmes on the basis of the time and channel of a television programme displayed in the part 312 selected from the page of teletext which contains television programme listings. This has the advantages that television programmes may thus be recorded by a user of this preferred embodiment of the invention in the absence of independently available information specifying the times and channels of television programmes, such as a television programme listings magazine, and on the basis of regularly updated - and hence more reliable - information. In practice, the recording of television broadcasts or transmissions from the data processing means 1 to means 5 for recording television programmes requires the use of a P1394 interface (known colloquially in the industry as "Fire Wire") as the operable connection between the data processing means 1 and the recording means 5. Thus the recording means 5 may at present be provided by a DVD RAM drive, as mentioned above, but not by a conventional video cassette recorder (VCR), which lacks the capability of connection through a P1394 interface. (It remains possible, of course, to connect the television and teletext receiving means 22 and 21 in a configuration not shown in Fig. 6 to a VCR, the VCR itself being able to receive television broadcasts or transmissions, so that a television signal first passes through the VCR before being transmitted to the television and teletext receiving

means 22 and 21. Such a configuration not shown in Fig. 6 permits the conventional recording of television programmes directly to video, but does not, of course, provide the advantages of the invention described above.)

The means for selecting a part 312 of a page 311 of teletext displayed by the display means 31 may also be used to select from a page 311 of teletext which contains an index or cross-reference to other teletext pages the number of a second page of teletext. In this way, a page of teletext not already assigned to a selectable icon 23 may be accessed with the same speed and ease as for accessing a page already assigned to an icon by programming the data processing means 1 in a manner well known to a person skilled in the art to retrieve teletext data from the data storage means 4 corresponding to the number of the unassigned page of teletext displayed in the part 312 of the page 311 of displayed teletext.

The functions, arrangement and operation of a computer according to the present invention are most easily put into effect by programming a CPU within the data processing means 1 with a 32-bit application program. Fig. 8 shows schematically one example of such a 32-bit application program linked to a 16-bit application program by thinking. Thinking is the process by which a 32-bit application program communicates with a 16-bit computer operating system. A 32-bit self-executing application program 6 links to a set of 32-bit interface library routines 7. A step-down think 8 in turn links the 32-bit interface library routines 7 to a set of 16-bit interface library routines 9. The 16-bit interface library routines 9 are linked to 16-bit library routines executable by a computer operating system to implement the functions of the computer in this embodiment of the invention. Such an implementation may be used to support any of various proprietary teletext or videotex services, such as Ceefax, Oracle and 4-Tel in the UK, German TopText and Japanese system.

CLAIMS

1. A computer comprising data processing means and operably connected thereto, input means, output means and data storage means, wherein said input means comprise means for receiving and demodulating into data teletext or videotex broadcasts or transmissions and said data processing means comprise means for transferring teletext or
5 videotex data to said data storage means for subsequent access and/or retrieval by said data processing means.
2. A computer according to claim 1, wherein said data processing means comprise:
means for retrieving teletext data from said data storage means;
10 conversion means for converting teletext data into a format suitable for displaying at least one page of teletext; and
means for transferring the result of such a conversion from said conversion means to said output means.
- 15 3. A computer according to claim 2, wherein said output means comprise display means for displaying at least one page of teletext.
4. A computer according to any preceding claim, wherein said input means further comprise means for receiving television transmissions or broadcasts and said output
20 means comprise means for displaying television programmes.
5. A computer according to any preceding claim, wherein said data processing means comprise data transfer means for transferring data to said output means from said input means or from said data storage means, wherein said data transfer means is operable
25 simultaneously with said means for receiving and demodulating teletext broadcasts or transmissions and with said means for transferring teletext data to said data storage means.

6. A computer according to claim 5, wherein said data transfer means is operable to transfer television transmissions or broadcasts from said means for receiving television transmissions or broadcasts to said means for displaying television programmes.

7. A computer according to claim 5, wherein said transfer means comprises said conversion means and said means for transferring the result of such a conversion to said output means, and wherein said data transfer means is operable to transfer teletext data from said means for receiving and demodulating teletext broadcasts or transmissions to said means for displaying at least one page of teletext.

8. A computer according to any preceding claim, wherein said input means comprise a plurality of selectable icons, such an icon corresponding to a respective page of teletext, whereby selection of the icon causes said data processing means to retrieve teletext data from said data storage means, to convert said teletext data into a format suitable for displaying said respective page of teletext and to transfer said page to said output means.

9. A computer according to claim 8, wherein said plurality of selectable icons is a subset of a menu of icons stored in said data storage means, said selectable icons being choosable from said menu of icons.

10. A computer according to claim 8 or claim 9, wherein said data processing means is operable to assign such a selectable icon to the respective page of teletext corresponding to that icon.

11. A computer according to claim 10, wherein said input means comprise means for receiving information specifying which page of teletext said data processing means is operable to assign to which selectable icon.

12. A computer according to claim 11, wherein said means for receiving information
5 is an operable connection to the Internet.

13. A computer according to any preceding claim, wherein said data processing means
is programable to transfer teletext data to said data storage means at a prespecifiable time.

10 14. A computer according to any one of claims 3 to 13, wherein said input means
comprises means for selecting a part of a page of teletext displayed by said display
means.

15 15. A computer according to claim 14, wherein said means for selecting a part of a
page of teletext is operable to select the time and channel of a television programme from
a page of teletext.

16. A computer according to claim 15, further comprising an operable connection to
means for recording television programmes and wherein said data processing means is
20 programable to transfer television transmissions or broadcasts to said means for recording
television programmes on the basis of the time and channel of a television programme
selected with said means for selecting a part of a page of teletext.

17. A computer according to any one of claim 4 to 16, wherein said display means for
25 displaying at least one page of teletext is operable simultaneously with said means for
displaying television programmes.

18. A method of operating a computer comprising:
providing said computer with means for receiving teletext or videotex broadcasts
30 or transmissions,

demodulating said teletext or videotex broadcasts or transmissions into data, and storing said data retrievably in a memory.

5

19. A method of operating a computer according to claim 18, said method further comprising:

accessing and retrieving said data from said memory, and converting said data into a format suitable for displaying at least one page of teletext.

10

20. A method of operating a computer according to claim 18 or claim 19, said method further comprising:

selecting a page of teletext from data in said memory by means of an icon corresponding to said page of teletext, said icon being selectable from a plurality of icons displayed by said computer.

15

21. A method of operating a computer according to claim 20, said method further comprising:

providing said computer with means for receiving information specifying which of said plurality of icons corresponds to which page of teletext in the data in said memory.

20

22. A method of operating a computer according to any one of claims 18 to 21, further comprising:

programing said computer to receive, demodulate and store data from teletext broadcasts or transmission at a prespecified time.

25

23. A method of operating a computer according to any of claims 19 to 22, further comprising:

displaying a page of teletext, and selecting a part of said page of teletext.

30

24. A method of operating a computer according to claim 23, further comprising:
5 programming said computer to transfer television transmissions or broadcasts at a prespecifiable time to means for recording television programmes by performing said selecting of a part of a page of teletext.

25. A method of operating a computer according to any one of claims 18 to 24, further
10 comprising:

providing said computer with means for receiving television transmissions or broadcasts, and displaying said television transmissions or broadcasts at the same time as storing data demodulated from teletext broadcasts or transmissions retrievably in a memory.

15

26. Use of a computer to receive teletext or videotex broadcasts or transmissions, demodulate said teletext broadcasts or transmissions into data and store said data retrievably in a memory.

20 27. A computer for receiving, demodulating and storing teletext or videotex substantially as described herein with reference to the accompanying drawings.

28. A method of receiving, demodulating and storing teletext or videotex broadcasts or transmission with a computer, said method being substantially as described herein with
25 reference to the accompanying drawings.

29. Use of a computer for receiving, demodulating and storing teletext or videotex broadcasts or transmissions substantially as described herein with reference to the accompanying drawings.

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Claims searched: All

Examiner: R F King
Date of search: 30 October 1996

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H4F[FBB]; H4T[TDDA]

Int Cl (Ed.6): H04N 5/445, 7/025, 7/08-7/088

Other: ONLINE: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB2283399 A [AMULET ELECTRONICS] See abstract	1,18 and 26 at least
X	GB2257876 A [SAMSUNG] See abstract	"
X	GB2229070 A [TOSHIBA] See abstract	"
X	WO 86/01359 [PRUTEC LTD] See abstract	"
A	GB2222051 A [TOSHIBA] See abstract	"
A	US5359367 [VIDEOLOGIC] See abstract	"

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
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